

SECTION III

2003 BENCH BG-174A RULES

Posted 3/7/2003

2003 BENCH BG-174A CONTEST RULES

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Section III

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RULES GOVERNING 2003 BENCH BG-174A CONTEST AND INTERPRETATIONS OF DISCOUNT CARDS

1. Each participant must be under guard before the start of the Contest in a location assigned by the Chief Judge and must remain continuously under guard until time to work the problem. Participants under guard must be in a location where they will be unable to obtain any information concerning the problem to be worked. Any participant receiving information concerning a Contest problem prior to starting to work the problem will be disqualified by the Chief Judge and the Assistant Chief Judge. No person, except guards and Contest officials assigned to give the written examination, will be allowed to communicate with any participant under guard. Those who have performed will not be permitted to communicate with any participant awaiting their turn to perform.
2. Any indication of receiving unauthorized information during the working of the problem may result in disqualification as determined by the Chief Judge and the Assistant Chief Judge. No one except judges, Contest officials, and working participants will be permitted in the work area, unless special approval is given by the Chief Judge. Communication with bench participants, except for the judges, is prohibited. News media and photographers who wish to be in the working area must receive permission from the Co-Directors and be accompanied by a Contest official.
3. Any bench participant not in place and ready at the time specified will be disqualified from the Contest.
4. The bench participant will be provided with two BG-174A apparatuses (one disassembled, one assembled), an RZ-25 tester, a stopwatch, defogging solution, leak detector fluid and a tool kit. The work at the bench will consist of (1) a visual examination of a disassembled BG-174A and the proper assembly and preparation for use in rescue work. This will include correcting any predetermined problem(s) so that the apparatus is in proper working order. Simulating defogging of the facepiece lens will be done as part of the visual examination. This visual examination, correcting predetermined problem(s), and proper assembly can be done at any time allowed for working of the problem. (2) Test the assembled BG-174A apparatus with a RZ-25 tester, and correct the predetermined problem(s) so that the apparatus is in proper working condition. Except for removing the test cap from the breathing hoses at the double socket connection, the assembled BG-174A apparatus cannot be disassembled to look for problems, until the hoses are attached to the RZ-25 tester. When testing is completed on the assembled BG-174A apparatus, the hoses shall be removed from the tester, connected to the

facepiece, and the back cover installed. This shall be done before the clock is stopped.

5. Spare parts to correct the predetermined problem(s) will be provided once the bench participant has specifically identified the problem. This will require the participant to point out the exact location of the deficiency. (Example: Positive pressure leak in the breathing bag. Participant will identify the location of the hole.)
6. When an unplanned deficiency is encountered with the apparatus, the participant will be notified by the judges that the deficiency is not part of the problem. The judge will stop the clock, and any time used to correct the deficiency will not be charged to the working time. However, the process of verbal elimination shall not be used by the bench participant to find the predetermined problem(s). If it becomes obvious to the judges that this is occurring, the first offense will result in a warning, the second offense a discount, and the third offense could result in disqualification as determined by the Chief Judge. (Example: Participant verbally identifies a deficiency with every part of the facepiece when only one predetermined problem exists.)
7. The bench participant will not be allowed to bring any materials, written information, or records to the work site. The participant will not have to create a test record; however, he or she may write the test from memory on paper that will be provided for that purpose after the official working time has started.
8. Tests will be performed in sequence on the assembled BG-174A apparatus using the standard test procedures with the RZ-25 tester as outlined in the Draeger Safety BG-174A Test, Maintenance and Troubleshooting Manual (February 1999, edition).
9. A maximum of 30 minutes will be allowed to complete the problem. The bench judge will inform the participant when he has one minute remaining to work the problem. At the completion of the problem, the judge(s) and the participant will note the working time of the problem with the official timekeeper. Work done after the clock is stopped will not be recognized.
10. Manually abusing or intentionally over or under pressurizing the RZ-25 tester substantially will be considered abusing the equipment. If the participant is observed abusing the RZ-25 tester, the first offense will result in a warning, the second offense will result in a discount, and the third offense could result in disqualification as determined by the Chief Judge.

A. Written Examination of Bench Participant

1. The written examination shall consist of 30 questions. Twenty questions for the written examination will be taken verbatim from the Statements of Fact which will be fill in the blank and each blank shall represent a key word with no more than three blanks per statement. Ten questions will be taken verbatim from identification of parts. Thirty minutes will be allowed for the written examination.
2. In special circumstances, individual bench participants may be given oral instead of written examinations by at least two judges. Requests for consideration shall be presented to the Co-Directors of the Contest at the time of registration.
3. Bench participants will be separated to the extent possible, and every effort will be made to prohibit discussion of questions and answers among the bench participants.

B. Miscellaneous

1. In the event of ties in the Bench Contest, the number of discounts at bench will be the first tie breaker; the number of discounts on written examination will be the second tie breaker; and the official working time at bench in minutes and seconds will be the third tie breaker.
2. The bench participant and trainer will report to a designated location to review and prepare protests within one hour of notification. Twenty minutes will be given to review and prepare written protests. All protests will be considered by the Chief Judge and his/her Assistant and their decision will be binding.
3. Bench participants must be bonafide employees of the mining industry or members of mine rescue teams designated to fulfill the requirements of 30 CFR Part 49. This does not exclude bench participants whose team is not participating at the National Contest.
4. Disputes with regard to the Bench Contest (except discounts), shall be immediately filed with the Co-Directors. Disputes filed shall be in writing and set forth incidents, times, names source of information and act complained against. Complainant shall remain accessible to the Co-Directors until the complaint is resolved. A decision by the Co-Directors shall be final.

Interpretations of Discount Sheet

A. Written Examination

1. For each incorrect answer_____1

B. Time

The time will be recorded in minutes and seconds.

C. Competition at Bench

1. Failure to verbally identify each test being conducted_____2

Verbally identify each test being performed.

2. Failure to verbally identify each problem_____5

Failure to verbally identify is also interpreted as failure to find the problem.

3. Failure to correct each problem_____5

The bench participant shall properly correct the problem and continue with the proper tests. Once a bench participant finds a predetermined problem and does not correct it before continuing with the remaining tests, he/she shall receive a five point discount for continuing without correcting the problem and a pending five point discount for failing to correct the problem. If all of the remaining tests are properly conducted and passed and the participant returns to the uncorrected problem and corrects it, the pending five point discount will not be assessed. Should the participant continue on from this point and properly conduct all of the remaining tests again, he/she would also have the original five point discount for continuing tests removed.

4. Failure to conduct any visual examination or test on the BG-174A, each test_____5

5. Failure to tighten connections properly during assembly or testing, each connection_____1

All connections must be tightened on the apparatus and verbally identified as hand tight or wrench tight at the time the connection is tightened. Failure to verbally identify at the time the connection is being tightened will result in a one point discount for each. Zero adjustments shall be made on RZ tester prior to connecting the breathing hoses to the RZ-25 tester.

This includes:

- .Hose adapter on the RZ-25 - hand tight
- .Screw ring cover on lung demand valve assembly - hand tight
- .Absorbing cartridge connections - hand tight
- .Plug on training canister (if applicable) - wrench tight
- .Breathing bag - hand tight
- .Supplementary oxygen line connection at lung demand valve - hand tight
- .Pre-flush/dosage line connection - hand tight
- .Cylinder connections - hand tight
- .Locking screw on saliva trap - wrench tight
- .Breathing hoses (once testing has begun or during the visual examination on the disassembled apparatus) - hand tight

Once the zero adjustment on the tester has been made, do not readjust setting for balance of tests.

6. Failure to comply with rules not covered in discount sheet, each infraction_____2

If the discount is not listed on the discount sheet, and if it is not covered under one of the approved rules of the Contest, do not improvise a discount to cover the suspected violation.

D. Visuals

1. Failure to conduct a proper visual examination of the frame/harness_____1

The visual examination will include an examination of the harness assembly, frame, back cover, visible sealing rings, external gage, O₂ regulator, and warning whistle. Failure to examine and verbally identify the examination will result in one discount for each. (Maximum 4 points)

2. Failure to conduct a proper visual examination of the breathing bag_____1

The participant will verbally identify that the breathing bag is being examined for pliability and signs of deterioration. Stretching or manipulating the breathing bag with a massaging action will be part of this examination. The participant will verbally identify that the o-ring and sealing rings are being examined for signs of deterioration. Failure to examine and verbally identify the examination will result in one discount for each. (Maximum 2 points)

3. Failure to conduct a proper visual examination of the O₂ cylinder_____1

A proper cylinder examination includes a visual inspection of the cylinder. The participant will verbally identify the cylinder pressure on the gage, the pressure rating on cylinder, the hydrostatic test date, and identify if the cylinder is plus rated. Participant will inform the judge if the cylinder pressure is less than 1,400 PSI. Failure to examine and verbally identify the examination will result in one discount for each. (Maximum 4 points)

4. Failure to conduct a proper visual examination of the regenerative canister_____1

A proper examination includes a visual inspection for dents and defects. If a factory packed canister is used, verbally identify that the seal(s) is/are in place, and identify the expiration date with month and year. If a training canister is used, only the visual inspection for dents and defects is required. Failure to examine and verbally identify the examination will result in one discount for each. (Maximum 3 points)

5. Failure to conduct a proper visual examination of the facepiece_____1

The visual examination will include an examination of the head strap assembly, mask body (including sealing edges), the lens, speaking diaphragm, wiper, and neck strap. Failure to examine and verbally identify the examination will result in one discount for each. (Maximum 4 points)

6. Failure to conduct a proper visual examination of the hoses_____1

The participant will verbally identify that the hoses are being inspected for pliability and signs of deterioration. Stretching or manipulating the hoses with a massaging action will be part of this examination. The participant will verbally identify that the o-rings and sealing rings, including the sealing ring on the saliva trap, are being examined for signs of deterioration. Failure to examine and verbally identify the examination will result in one discount for each. (Maximum 2 points)

E. RZ-25 Tester

1. Failure to conduct the proper exhalation valve test_____2

Cap off exhalation hose and connect inhalation hose to exhalation valve connection on apparatus. Set RZ-25 tester on negative pressure pumping, gently activate bellows, and watch breathing bag. If valve is operating properly, bag should not begin to deflate after five seconds.

2. Failure to conduct a proper inhalation valve test_____2

Remove hose from exhalation valve and connect to inhalation valve. Set RZ-25 tester on positive pressure pumping, gently activate bellows and watch breathing bag. If valve is operating properly, bag should not begin to inflate after five seconds.

3. Failure to conduct a proper relief valve test_____2

Remove cap from exhalation hose and connect to apparatus. The RZ-25 tester is set on positive pressure pumping. Activate bellows and listen for opening of relief valve once breathing bag is full. Valve should open between +10 mm H₂O (+1 mbar) and +40 mm H₂O (+4 mbar). Participant will verbally identify reading of opening of valve. This indication can also be felt by wetting skin between index and middle finger and holding in front of hole in relief valve cover.

NOTE: A more precise test of opening pressure for relief valve can be made by opening cylinder valve (with tester set on negative pressure pumping) and setting tester on leak test. Flow of oxygen from constant dosage will cause relief valve to open with opening pressure indicated on tester gage. If this alternative test is used, it must be done after the completion of the preflush/pressure gage equalization test.

4. Failure to conduct a proper positive pressure leak test_____2

Set RZ-25 tester on positive pressure pumping. Plug opening in pressure relief valve cover and warning whistle. Activate bellows until needle on tester reads +100 mm H₂O or +10 mbar. Switch to leak test. Bleed needle down to +70 mm H₂O or +7 mbar and start stopwatch. Needle should not drop more than 10 mm or 1 mbar in 60 seconds. (Other work can be done during this time.)

5. Failure to conduct a proper negative pressure leak test_____2

Remove plug from relief valve cover. Set tester on negative pressure pumping and activate bellows until needle on tester reads -100 mm H₂O or -10 mbar. Switch to leak test. Bleed needle up to -70 mm H₂O or -7 mbar and start stopwatch. Needle should not rise more than 10 mm H₂O or 1 mbar in 60 seconds. Remove whistle cover after test. (Other work can be done during this time.) Participant may use his/her hand to assist in deflating the bag.

6. Failure to conduct a proper pre-flush/pressure gage equalization test_____2

Remove whistle cover from warning whistle. Set tester on negative pressure pumping. Open cylinder valve and watch breathing bag. Bag should completely inflate and there should be a short chirp of the whistle. Cylinder gage and external pressure gage should equalize to within +10 percent of each other. The participant will verbally identify the reading of the cylinder gage and the external pressure gage.

7. Failure to conduct a proper breathing bag volume test_____2

Set RZ-25 tester on negative pressure pumping. With breathing bag full, activate bellows and listen for lung demand valve opening. Valve should not open before tenth stroke of bellows.

8. Failure to conduct a proper lung demand valve test_____2

Set RZ-25 tester on negative pressure pumping and open cylinder valve. Activate bellows and listen for lung demand valve opening. Valve should open between -10 mm H₂O (-1 mbar) and -40 mm H₂O (-4 mbar). Participant will verbally identify reading of opening of valve.

9. Failure to conduct a proper constant dosage/bypass test_____2

Deflate breathing bag. Set RZ-25 tester to red dosage and plug pressure relief valve cover. Activate bypass valve and listen for flow of oxygen into the circuit as bag inflates. Release bypass button when needle has reached 1.7 LPM on the outside red scale. Remove plug from relief valve after test. Participant will verbally identify final reading.

10. Failure to conduct a proper whistle activation test_____2

Close cylinder valve and watch external pressure gage. Whistle should activate at approximately 700 PSI for a four hour apparatus. Participant will verbally identify reading when whistle was activated. (The participant may use the manual bypass valve to bleed down the gage, but must release the valve before the whistle is activated.)

11. Failure to conduct a proper whistle duration manual cut-off test_____2

Lift manual cut-off lever on the oxygen distributor, open cylinder valve (with RZ-25 tester set on negative pressure pumping) and start stopwatch. Stopwatch will be stopped when 60 seconds pass. Participant will verbally identify duration of whistle and reading on external gage. Return manual cut-off lever to original position and place the pressure gage back into the protective cover. (No other work can be done during this test.)

12. Failure to conduct a proper high and medium pressure leak test_____2

Before turning off the cylinder valve, coat the high and medium pressure lines (connections) with a leak detector solution and observe for leaks (formation of bubbles). This test can be simulated, however, the bench participant shall physically touch each connection with the bottle tip of the leak detector solution (closed). Tests can be conducted anytime while the apparatus is pressurized. Shut off cylinder valve after test.

**STATEMENTS OF FACT
BENCH BG-174A CONTEST**

1. The positive pressure leak test is to insure that no oxygen escapes to the outside atmosphere during operation of apparatus.
2. A leaking diaphragm will create a low opening pressure.
3. An old diaphragm which has lost its flexibility due to age will create a high opening pressure.
4. The pressure relief valve is designed to open when the pressure within the breathing circuit is between +10 and +40 millimeters (+1 mbar and +4 mbar) of pressure measured on the water gage.
5. Once zero adjustment has been made on RZ-25 tester, do not readjust setting for balance of tests.
6. All connections must be tightened on apparatus and zero adjustment made on RZ-25 tester prior to connecting breathing hoses to apparatus.
7. The exhalation valve should allow the breathing air to pass in only one direction toward the regenerative canister.
8. During the exhalation valve test, if valve is operating properly, breathing bag should not deflate.
9. The inhalation valve should only allow the breathing air to pass in one direction toward the face mask.
10. During testing of the inhalation valve, if valve is operating properly, the breathing bag should not inflate.
11. During the positive pressure leak test, the needle on the RZ-25 tester should not drop more than 10 mm H₂O or 1 mbar in 60 seconds.
12. The screw ring cover on the lung demand valve assembly and connections on the breathing bag are hand tight connections.
13. The negative pressure leak test is to insure that no toxic gases enter the breathing circuit during operation of the apparatus.
14. During the negative pressure leak test, the needle of the RZ-25 tester should not rise more than 10 mm H₂O or 1 mbar in 60 seconds.

15. The BG-174A is equipped with a pre-flushing device which automatically purges the nitrogen rich ambient air, initially found in the breathing circuit, with pure oxygen.
16. Once the oxygen cylinder valve is opened and the unit is charged with oxygen, the pressure gage on the oxygen cylinder and the chest gage on the flexible line must equalize to within 10 percent of one another.
17. All BG-174A oxygen cylinders that show zero pressure on the gage must be purged and vacuumed to remove any contaminant or moisture that may have entered due to lack of pressure in the cylinder.
18. The lung demand valve automatically goes into action if more than the allotted dosage of 1.4 - 1.7 LPM of oxygen is consumed by the wearer.
19. During the lung demand valve test, the valve should open between -10 mm H₂O (-1 mbar) and -40 mm H₂O (-4 mbar).
20. The breathing bag volume test is done to insure that the breathing bag has correct volume, which should be at least five liters.
21. Each complete stroke of bellows on the RZ-25 tester is equal to 0.5 liter.
22. During the bypass test, a failure of the bypass valve to instantly provide oxygen into and fill the breathing bag at a rate of approximately 50 LPM in less than 10 seconds is an indication of an internal failure in the oxygen distributor.
23. Constant dosage in the BG-174A is preset at approximately 1.5 liters/minute.
24. Three factors affecting constant dosage are: diameter of dosage orifice, constant pressure, and elevation and atmospheric pressure.
25. The dosage orifice within the oxygen distributor has an opening of approximately 0.17 mm.
26. Oxygen under a constant pressure of 57 PSI is forced through the orifice at an approximate rate of 1.5 liters/minute.
27. The constant pressure of 57 PSI is maintained by the reciprocating action in the oxygen distributor.
28. During the constant dosage test, the breathing bag is deflated, the RZ-25 tester is set to red dosage, and the pressure relief valve cover is plugged.

29. During the constant dosage test, the needle of the RZ-25 tester should automatically settle between 1.4 and 1.7 LPM.
30. Although the RZ-25 tester measures dosage, it is not a flowmeter.
31. The RZ-25 tester is operated by over pressurizing the breathing circuit.
32. The pre-flush/dosage line connection is tightened by hand.
33. The plug on the training canister is tightened by wrench.
34. When it is assured that all hand tight and wrench tight connections are securely fastened, low dosage can usually be attributed to a damaged o-ring or washer.
35. Any leak in the breathing circuit will prevent the apparatus from over pressurizing, thus indicating a low dosage.
36. The oxygen cylinder connection is tightened by hand.
37. The locking screw on the saliva trap is tightened by wrench.
38. The hose adapter on the RZ-25 tester is tightened by hand.
39. The breathing hoses are tightened by hand.
40. During the constant dosage test, a reading of less than 1.4 LPM is low dosage.
41. A high dosage indication can almost always be attributed to a leak at the valve head inside the lung demand valve.
42. An internal leak at the valve head inside the lung demand valve may not be detectable with the positive and negative pressure leak tests.
43. The warning whistle is designed to activate when the pressure in the oxygen cylinder has dropped to approximately 20 percent of the original cylinder pressure.
44. During the whistle activation test, the warning whistle should activate at approximately 700 PSI for a four hour apparatus.
45. If during testing the warning whistle fails to activate at the prescribed setting, the warning whistle should be removed from the apparatus and returned to the manufacturer or their agent for adjustment.

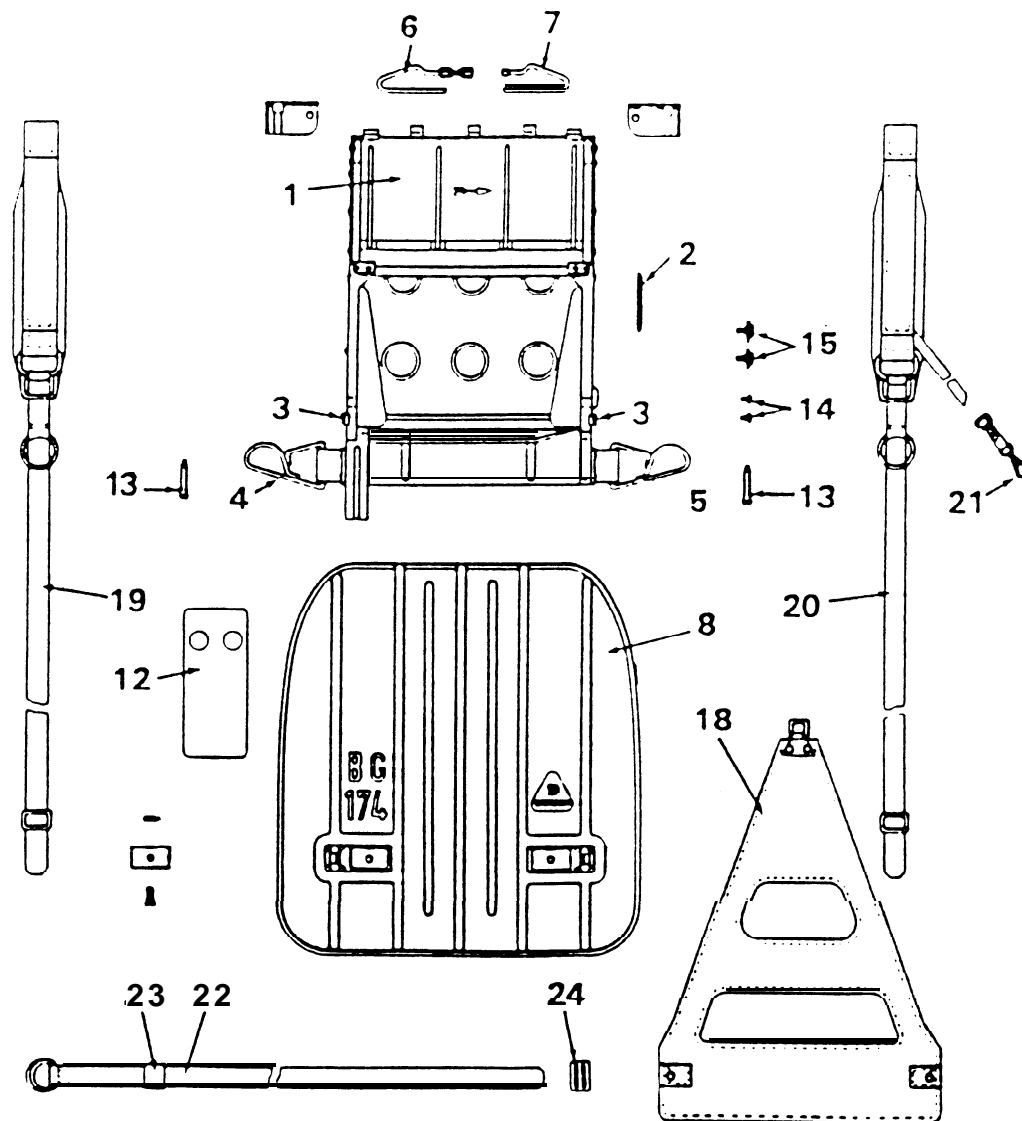
46. If while wearing the apparatus the warning whistle should sound with each inhalation or with each activation of manual bypass valve, this is another indication of clogged sieves in the oxygen distributor rather than a defective whistle.
47. During the whistle duration/manual cut-off test, the warning whistle should sound for 20 to 60 seconds before automatically sealing itself.
48. If during the whistle duration/manual cut-off test, the warning whistle sounds less than 20 seconds, it may not be giving the user an adequate warning.
49. If during the whistle duration/manual cut-off test, the warning whistle sounds longer than 60 seconds, it is wasting valuable oxygen.
50. The manual cut-off lever is located on the oxygen distributor.
51. The manual cut-off lever is designed to isolate the chest gage in the event the gage or the flexible line develops a leak during operation.
52. The valve screw should be positioned so that the chest gage and flexible line are isolated when the manual cut-off lever arm is lifted to a 30 to 45 degree angle from the horizontal.
53. Prior to testing whistle duration and the manual cut-off valve, turn oxygen cylinder valve off, lift the manual cut-off lever, open oxygen cylinder valve (with the RZ-25 tester set on negative pressure pumping), and start the stopwatch.
54. When the system is pressurized, the high pressure and medium pressure lines can be tested for leaks by coating the connections with a soap lather or leak detection solution.
55. The BG-174A should be stored to protect against: dust, sunlight, heat, extreme cold, excessive moisture, damaging chemicals, and mechanical damage.
56. All parts exposed to the circulatory system of the BG-174A must be thoroughly washed in a good detergent/disinfectant, thoroughly rinsed, and dried after each wearing.
57. The face mask, breathing hose assembly, breathing bag, and lung demand valve assembly are parts exposed to the circulatory system that must be thoroughly washed after each wearing.
58. Before washing the lung demand valve assembly, it is absolutely necessary to isolate the lung demand valve.

59. An improper disinfectant or one that is not diluted properly could cause the rubber or neoprene parts to deteriorate prematurely.
60. Alcohol is not to be used to clean or disinfect any parts of the BG-174A.
61. If alcohol is used to disinfect or clean, it will break down the rubber in the face mask, hoses, and breathing bag.
62. The temperature of the air used to dry parts should not go above 140 degrees F (60 degrees C).
63. Storing the rubber or neoprene parts in areas with fluorescent lighting will have the same effect as direct sunlight.
64. Replace the o-ring at the oxygen cylinder connection at least once every six months.
65. All rubber or neoprene sealing rings should be replaced at least once every two years.
66. A new inhalation valve should be inserted into the lung demand valve assembly at least once every two years.
67. The lung demand diaphragm should be replaced after at least three years usage.
68. The o-ring under the speaking diaphragm should be replaced at least once every three years.
69. The oxygen distributor should be returned to the manufacturer or their agent for complete overhaul after at least five years usage.
70. The oxygen cylinder must be retested by a certified testing facility every five years.
71. The test date in month and year is stamped on top of all oxygen cylinders.
72. The lung demand valve assembly should be replaced at least every six years.
73. The warning whistle should be returned to the manufacturer or their agent for overhaul after at least six years usage.
74. When copper gaskets are removed from the BG-174A for any reason, they should not be reused.
75. Only USP medical oxygen is to be used to fill the BG-174A oxygen cylinders.

76. Before filling any oxygen cylinder, check the service rating and hydrostatic test date stamped on the cylinder.
77. If the oxygen cylinder is rated at 2600 PSI or 2850 PSI, it can be filled up to these pressures only.
78. Only oxygen cylinders rated at 2850+ can be filled to 3135 PSI.
79. The temperature in the areas for filling and storage of oxygen cylinders should be maintained at approximately 70 degrees F.
80. During the filling cycle, the temperature in the oxygen cylinder will rise in proportion to how fast the cylinder is filled.
81. A prerequisite for the safe use of an oxygen breathing apparatus is a proper maintenance program.
82. It is very important that an accurate record be kept of each test performed on the BG-174A with the RZ-25 tester.
83. When using a factory packed regenerative canister, insure that the string seal is in place and the expiration date has not been reached prior to removing the end caps and inserting the canister into the apparatus.
84. The expiration date is stamped on the white label attached to each factory packed regenerative canister.
85. The expiration date on each factory packed regenerative canister appears as a Roman numeral and year.
86. The BG-174A apparatus will not offer protection against poisonous gases absorbed through your skin.
87. The wearing harness consists of two adjustable shoulder straps with double slide buckles and a waist belt.
88. On the top of the oxygen cylinder is a safety device known as the pressure burst cap.
89. The pressure gages are marked in increments of 200 PSI and are luminous, so you can see them in the dark or in other conditions that limit visibility.

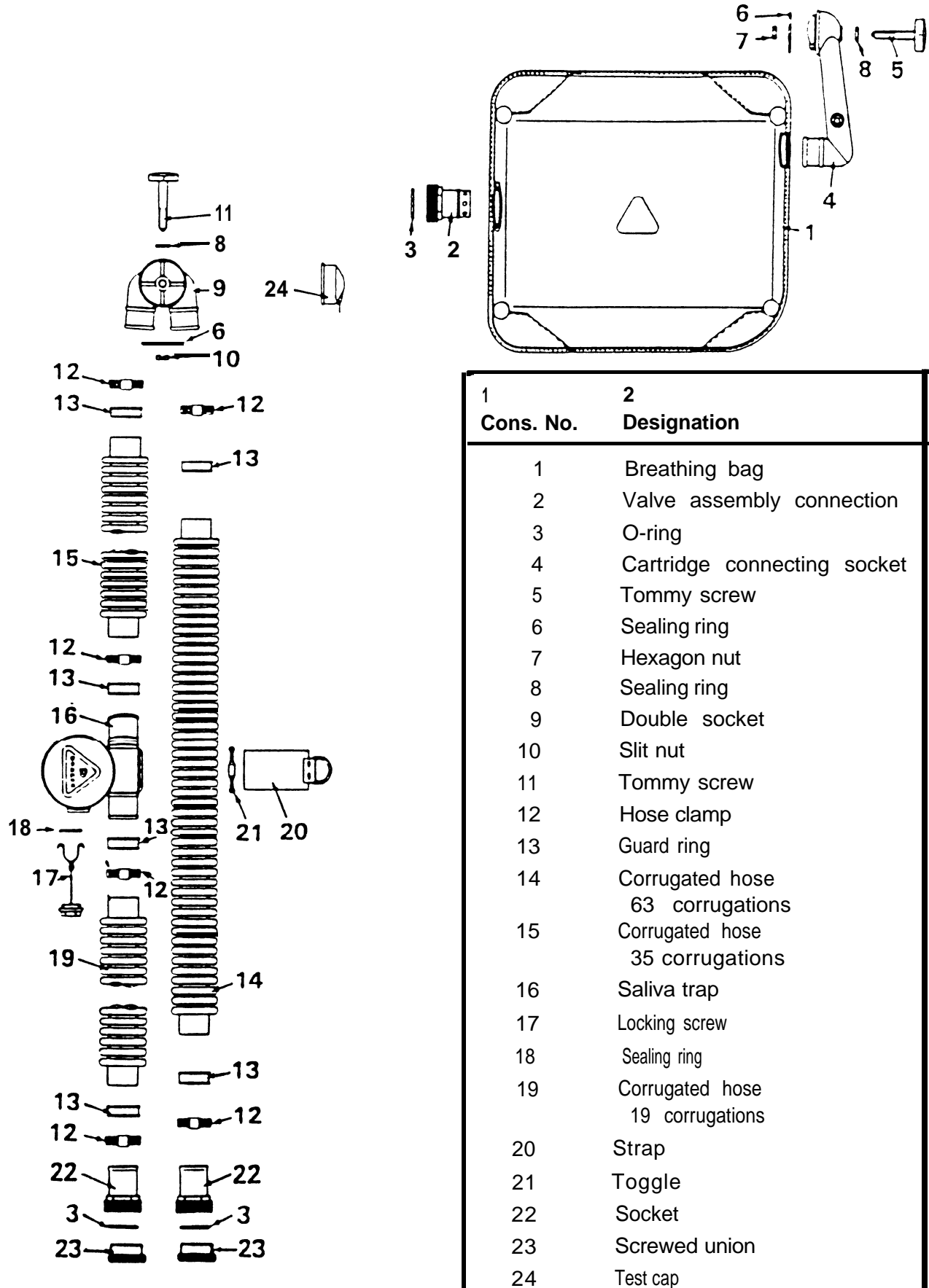
90. The special chemicals inside the regenerative canister absorb the carbon dioxide from the air that is exhaled by the wearer.
91. There are two types of canisters you can use with the Draeger BG-174A apparatus, refillable training canister and factory packed disposable canister.
92. The refillable training canister is made of stainless steel and can be used over and over again as long as the absorbent chemicals are freshly packed for each use.
93. Inside the refillable training canister is a set of baffles designed to expose more surface area of the chemicals to the exhaled air.
94. If the factory packed disposable rescue canister has expired, yet is still factory sealed, it can be used for training provided that the chemicals can be heard rattling around when the canister is shaken and the canister has not gained 10 or more grams in weight.
95. The lung demand valve assembly contains the diaphragm, pressure relief valve, lung demand valve, and inhalation and exhalation valves.
96. The pressure relief valve is the part of the lung demand valve assembly that keeps oxygen from building up in the breathing bag if you use less than the unit provides.
97. The saliva trap is on the inhalation hose because it must be located on the lowest part of the apparatus when it is worn so that the moisture will settle there.
98. Heat buildup within the unit's system is produced when your exhaled air flows through the regenerative canister.
99. The area where oxygen cylinders are filled and stored must have adequate ventilation to prevent a buildup of oxygen and reduce the potential for fire.
100. If you're using a high pressure oxygen pump to fill an oxygen cylinder, the pump itself should have a filter dryer installed on the gas inlet side of the pump to prevent moisture and dust from getting into the oxygen.

Carrying Frame Assembly with Protective Shell

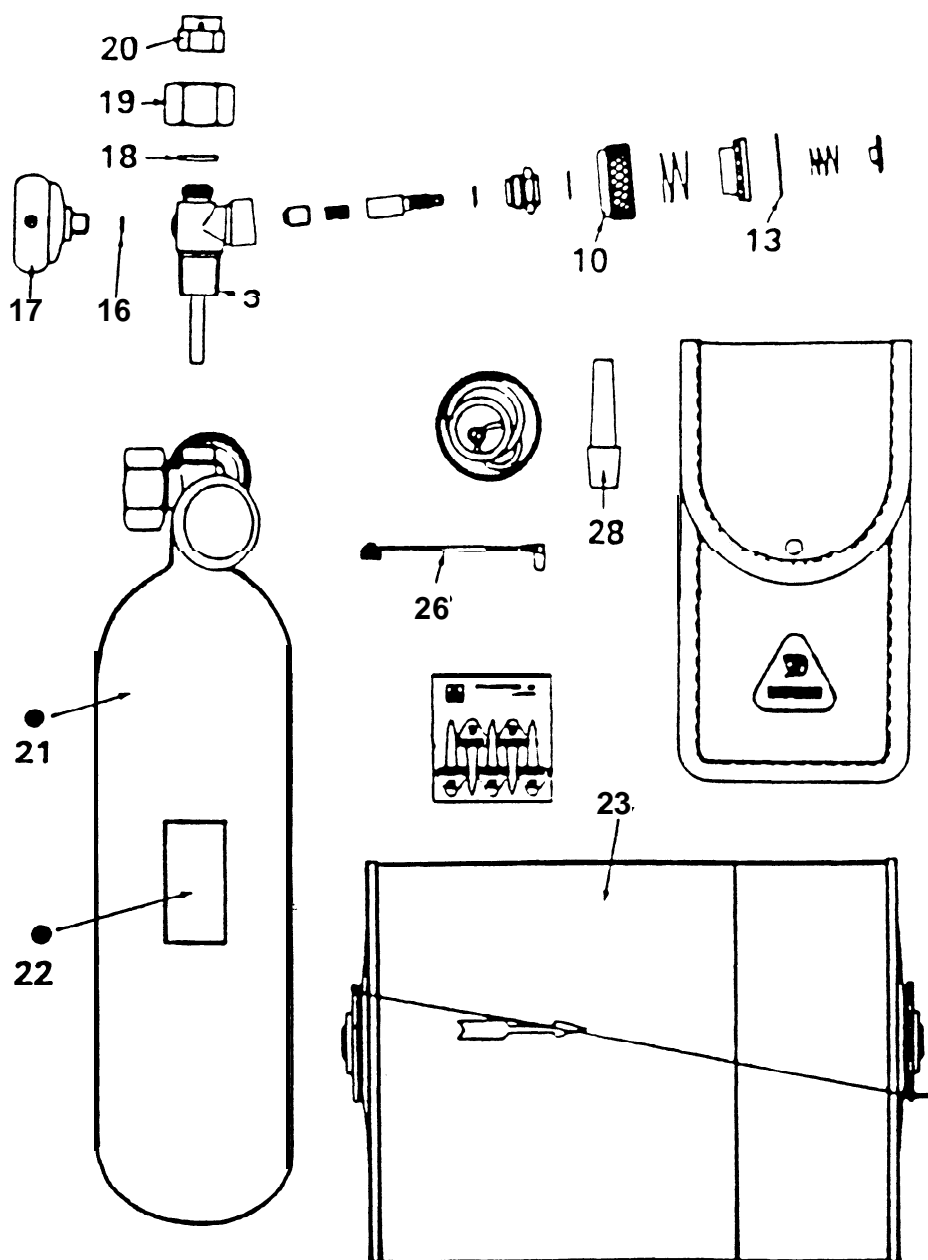


1 Cons. No.	2 Designation	1 Cons. No.	2 Designation
1	Carrying support	13	Screw
2	Protection ring	14	Screw
3	Snap	15	Screw
4	Belt bearing block, left	18	Back spanning
5	Belt bearing block, right	19	Carrying strap, left
6	Carrying loop, left	20	Carrying strap, right
7	Carrying loop, right	21	Buckle
8	Protective casing	22	Waist-belt
12	Approval label BG 174 A(4 h)	23	Slide
		24	Slide

Breathing Bag and Hoses Assemblies

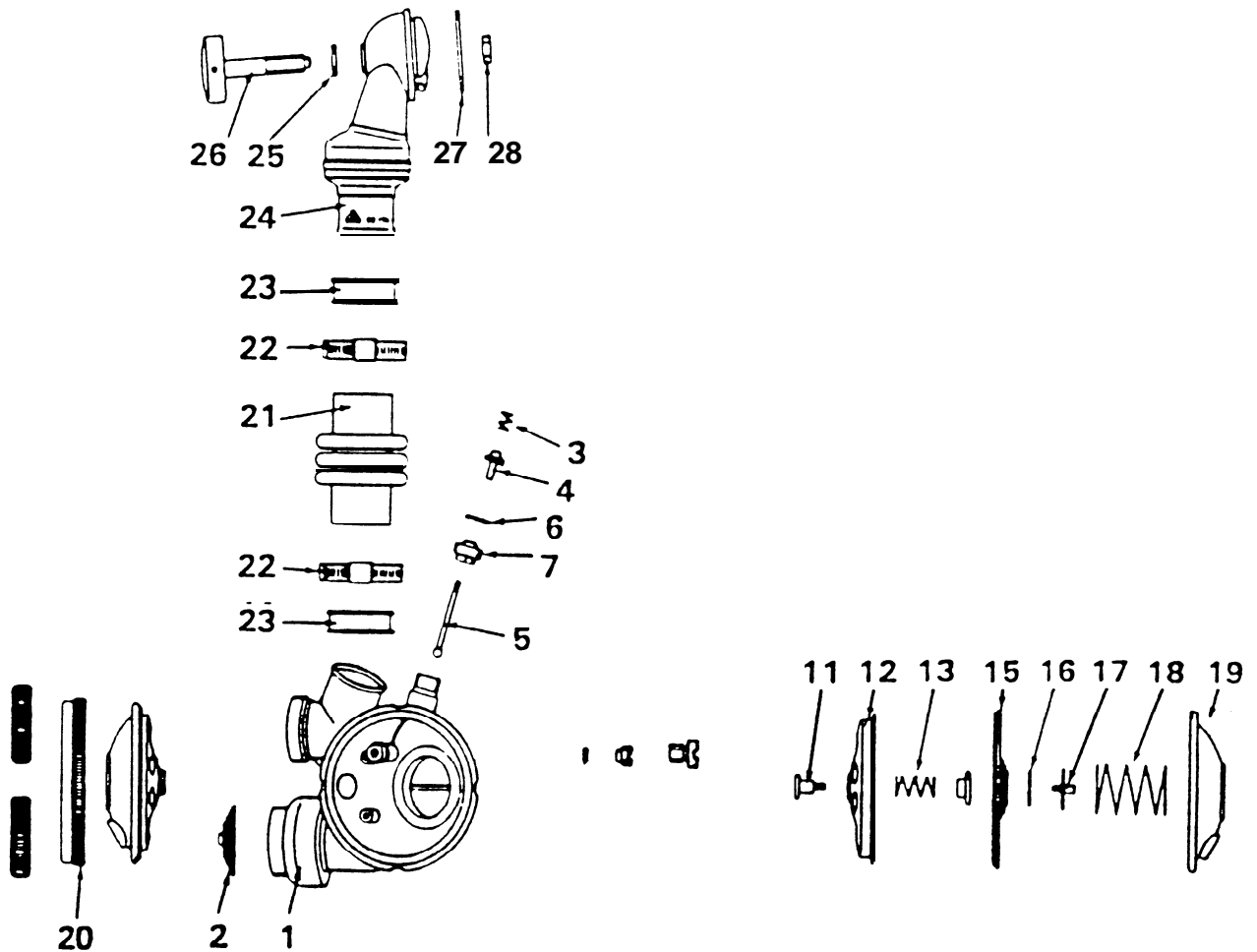


O₂ Cylinder, Cylinder Valve, Alkali Cartridge, Tool Kit



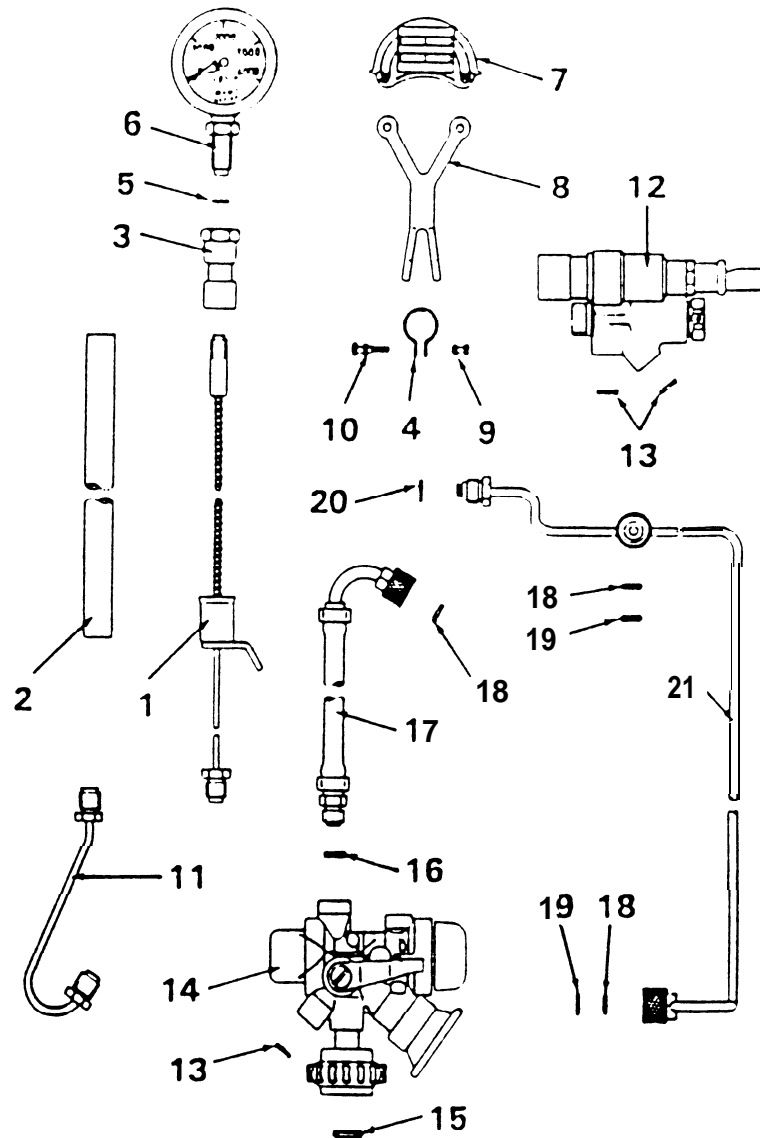
1 Cons. No.	2 Designation	1 Cons. No.	2 Designation
3	Valve housing	20	Bursting disc
10	Hand-wheel	21	Oxygen cylinder (4h)
13	Safety ring	22	Label (4h)
16	Sealing ring	23	Alkali cartridge
17	Manometer	26	Double washer
18	Lock washer	28	Test plug
19	Lock nut		

Lung Demand Valve Assembly



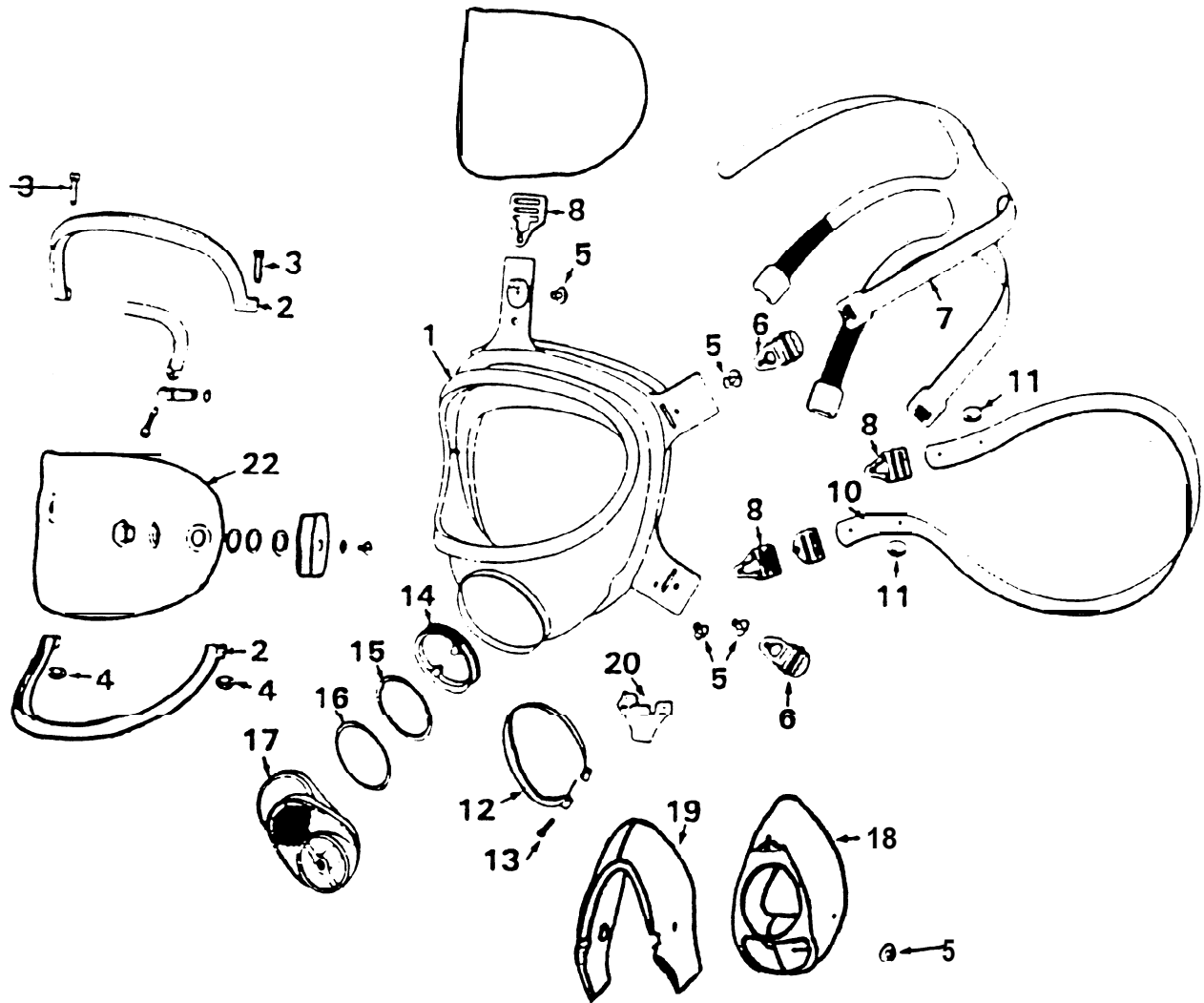
1 Cons. No.	2 Designation	1 Cons. No.	2 Designation
1	Valve box frame	17	Valve disc
2	Valve disc	18	Spring
3	Spring	19	Housing cover
4	Valve disc	20	Screw ring
5	Lever	21	Corrugated hose
6	Sealing ring	22	Hose clamp
7	Valve seat	23	Guard ring
11	Thrust bolt	24	Valve socket
12	Protective cage	25	Sealing ring
13	Spring	26	Tommy screw
15	Diaphragm	27	Sealing ring
16	Lock washer	28	Hexagonal nut

O2 Regulator, Warning Whistle, Oxygen Lines



1	2	1	2
Cons.	No. Designation	Cons.	No. Designation
1	High pressure line	12	Rest pressure warning
2	Protective hose	13	Sealing ring
3	Threaded sleeve	14	Oxygen distributor
4	Clamp	15	O-ring
5	Sealing ring	16	Sieve insert
6	Pressure gauge	17	Pre-flushing line
7	Protective cap	18	O-ring
8	Tightening strap	19	O-ring
9	Bushing	20	Sealing ring
10	Screw	21	O ₂ -line
11	High pressure line		

Panorama Z/ZS Mask



1	2	1	2
Cons. No.	Designation	Cons. No.	Designation
1	Mask body	12	Tightening strap
2	Frame	13	Screw
3	Screw	14	Screw ring
4	Nut	15	Speech diaphragm
5	Stud	16	O ring
6	Roller buckle	17	Connecting piece
7	Headstrap	18	Inner mask
8	Slide with eye	19	Filling piece
10	Strap	20	Support plate
11	Stud	22	Face plate